CASE STUDY:

RFID-BASED PROGRAMMING SYSTEM FOR SECURE USE OF RENAL DIALYSIS CARTRIDGES

SFO TECHNOLOGIES
A NeST Group Company

April 24, 2018

Client

A leader in medical technology, services, and solutions with a comprehensive product portfolio and broad global reach. They address universal healthcare needs and improve clinical outcomes through meaningful innovation; and deliver innovative, strategic and cost-effective IT solutions and services that drive business growth.

Business Need

The customer needed a device, which could be used in the manufacturing facility to secure program factory settings into RFID tags in the cartridges through an RFID Interface.

Business Impact

a) Our solution provided with a contact less, fast, cost-effective, secure connection to upload factory settings in the cartridges over the RFID interface.

Components and Technologies

a) Hardware

- Low cost, ARM Cortex Processor board
- Custom PCB with RFID Reader(MAX66300) mounted
- Antenna

b) Technology

- Embedded Linux Platform
- Cross compiled Embedded application
- RFID driver Integration with Linux Kernel
- Authentication and encryption of TCP communication
- Windows desktop application
- Java based for Controller system Emulator
- AES encryption
- Public/private key authentication

c) Compliance

- EN300 330-1 V1.8.1
- EN300 330-2 V1.6.1

Solution

SFO developed and manufactured a manufacturing programmer that secure programs the RFID tag in Renal Dialysis Cartridges. This integrates the factory settings into the cartridges via RFID interface. SFO was involved in hardware design and development, firmware development (Embedded Linux based), development of TCP application that communicates with the device over secured TCP, development of Windows PC applications for firmware upgrade over USB and upgrade of authentication secrets and other device parameters.

Keys to Success

- Seamless integration of firmware embedded board and off the shelf RFID board interfaced by board designed and manufactured by SFO.
- The Ethernet serial port inputs the factory data (via TCP) through the RFID reader (attached to the device) which process and converts to RF signals, and conveyed by the antennas to the cartridges in the Haemodialysis Console Systems.
- Cartridges run on conveyor belts and as they pass the RFID Reader the factory settings data is written on the cartridges. This increase the productivity manifold. The team simulated the server and designed a TCP emulator on which communication was tested. Firmware upgrade were also made possible over USB as certificates for authentication and RFID encryption key were loaded to TCP via the upgrade.

Highlights

- Secured TCP communication with PLC (controller) over Ethernet and PLC command handling.
- SSL Authentication
- Data Encryption/Decryption
- RSA 2048
- AES
- RFID tag Management
- Read/Write Secrets
- Tag authentication
- Read/Write Data
- Read/Write Protection
- Device settings and software upgrade over USB
- Fetching Service logs over USB

About SFO

SFO Technologies Pvt Ltd, the flagship arm of the diversified conglomerate, the NeST Group provides end-to-end design-engineering-software-manufacturing solutions to clients across geographies such as the USA, Canada, Europe, Middle East, South East Asia, Japan, Australia, and India. SFO has invested in building competence, scale and standards compliant process framework, in PCBA, fibre optics, Cable & wire Harness, Magnetics, High Level Assembly, VLSI design, embedded software development, etc. SFO's capabilities transcend the plain vanilla "Build-to-Spec or Build-to-Print" EMS and our ODM+ solutions are rapidly re-defining standards for the OEMs across Aerospace & Defence, Communications, Transportation, Healthcare and Energy & Industrial domains. .

Contact: contact@sfotechnologies.net www.sfotechnologies.net

SFO Technologies Pvt. Ltd.

Plot No. 2, Cochin Special Economic Zone (CSEZ), Kakkanad, Kochi (Cochin) – 682 037, India. Tel: 0484 – 6614300